DOCUMENT RESUME

ED 299 678 EA 020 407

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TITLE Legal, Societal, and Ethical Issues Concerning Intellectual Rights in Computer Education.
PUB DATE Oct 88
NOTE 21p.; Paper presented at the Annual Meeting of the Society of Scholars and Educators (13th, Miami Shores, FL, October 7-8, 1988).
PUB TYPE Speeches/Conference Papers (150) -- Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Software; *Copyrights; Court Litigation; Elementary Secondary Education; *Intellectual Property; *Patents; *Plagiarism; Public Schools

ABSTRACT

Computer software, which often takes years to produce, is currently being copied and used illegally in school settings. This violation of the law has many repercussions within the academic community. In this discussion, several court cases dealing with this situation are emphasized. It is also noted that the U.S. Office of Technology Assessment (OTA) has made an effort to differentiate between property rights and patents as this distinction applies to software. There are also recent additions to copyright laws that add computer software to those items protected. The educational community has typically not honored the copyright laws as they apply to the electronic media, though it has always strongly respected other kinds of intellectual property belonging to other persons. A recommendation is made that computer law courses must be developed for teachers so that they will be able to teach the legal requirements to their students and that academia in general must educate all those on campus as to what is appropriate, ethical, and legal behavior in respect to these issues. Twenty-seven references are appended. (LMS)

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LEGAL, SOCIETAL, AND ETHICAL ISSUES CONCERNING INTELLECTUAL PROPERTY RIGHTS IN COMPUTER EDUCATION

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Integrity in Education : Ethical, Societal, and Legal Issues

October 7-8, 1988

Andreas School of Business
Barry University
Miami Shores, FL 33161

EA020107

Legal, Societal, and Ethical Issues concerning Intellectual Property Rights in Computer Education

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Does an individual who has created, designed, debugged, and fine-tuned a piece of computer software have the right to sell her work? Is this work considered available to anyone able to duplicate it? Does she deserve renumeration for her work or does the computer philosophy of "Don't reinvent the wheel" become the winner of the stakes?

There are federal laws that uphold the writer's legal claim to his work for 50 years beyond his demise. Are they being upheld? Yes, but due to the tremendous explosion of technology within the past decade it is virtually impossible to monitor every use of each piece of computer software in existence.

What are the repercussions of this inability to enforce the existing laws? Software manufacturers are losing millions of dollars because of "pirating", a pseudo-romantic term for outright stealing. By robbing copies of software, both the software industry and the creator of the software package lose revenues due them for their work, time, and effort. How would an educator feel if someone stole all the lesson plans, final exams, and special materials she created? How would a student feel if someone "pirated" her term paper, dissertation or compiler program? Does such behavior

constitute "fair use?"

How does all this effect society? Why should a software writer continue in the field if her work can be stolen so easily? If she leaves the field, then her creativity will not be available to society anymore. Why should the software industry pour money into the development of software if that software becomes "public domain" illegally very soon after it hits the market? How can industry and business protect themselves? Costly copyright protection devices can be evaded. Lost software revenue may be regained by raising the price of software packages and passing the loss onto the consumer. Software manufacturers have united to fight computer crime, and society will pay for it.

Are educators ethically responsible for the use of computer software in their schools? How can they afford not to be? It is a crime. What policies should schools set to protect themselves from possible law suits? School personnel and students must be knowledgable about computer law, the societal effects of "piracy", and the ethics involved in keeping pace with the technology explosion in computer science. Computer crime is a serious problem in education.

In the following discussion, computer education will be used to refer to the knowledge base required for users of computers in academia. To start discussion, definitions of applicable terms are needed. The Office of Technological Assessment (OTA) published a report entitled "Intellectual Property Rights in an Age of Electronics and Information" in 1986. In that report, property rights were delineated.

> Property rights are granted as incentives and rewards. A property right might include, for example, one or any number of the following rights:
>
> 1. the right to possess or physically control something,
> 2. the right to use or enjoy its benefits,
> 3. the right to manage or decide how it is to be used,
> 4. the right to receive income from it,
> 5. the right to consume or destroy it,
> 6. the right to modify it,
> 7. the right to transfer it,
> 8. the right to distribute it,
> 9. the right to exclude others from using it.
>
> (Goldstein, pp. 21-22)

The OTA noted that new, emerging technologies and the legal aspects relating to them are not keeping pace with each other. Techonological developments evolve so fast that the laws required to deal with encountered problems are not available when needed. Some enumerated findings were:

> The application of a uniform system of intellectual property principles, such as that embodied in copyright and patent law, to divergent types of information-based products may no longer be possible.
>
> The assumption of intellectual property law that intellectual property rights can be determined and remain stable over time is less and less valid.
>
> Some of the technological impacts may only appear in the long term, when technologies for creating and disseminating information become more widely used.
>
> Some of the effects of technology on the adequacy of intellectual property law, however, have already begun to undermine its usefulness as a policy tool.
>
> (Goldstein, p. 59)

Further, the OTA noted that present copyright and patent laws do not adequately address the problems inherent in widespread use of computer software. Due to the abstract nature of the concept of intellectual property rights, a

clear definition is not easily attained. However, the OTA did make an attempt to define this abstruse concept. This is a giant stride forward with hopes that in the near future a working definition may be refined from the current attempt at one. The OTA defined intellectual property rights as "...a bundle of rights attached to the intangible form of an intellectual, scientific, or artistic creation." (Goldstein, p. 60) They contrasted personal property law as relating to ownership of things, with intellectual property rights as ownership of "...the particular form or expression embodied in things." To illustrate these distinctions,they gave the following illustrative examples:

1. Tangible Property: Brand X television set.

   Intellectual Property: The circuit design for all Brand X television sets.

2. Tangible Property: Bottle of chemical Z.

   Intellectual Property: A method of manufacturing chemical Z.

At the present point of time, such a distinction fails to be defined with clarity with respect to computer software, but it does serve the useful purpose of a much-needed beginning in dealing with such abstract concepts. In conclusion, the OTA stated:

> An intellectual property right is the exclusive prerogative to make tangible objects in particular forms. At its simplest, a copyright is the exclusive right to make copies of particular tangible expressions of information, and a patent is the exclusive right to make, use, or sell a particular application of an idea.
> (Goldstein, p. 61)

What are the legal issues concerning intellectual

property rights in computer education? Laws do exist. The 1976 Copyright Act and the 1980 copyright amendments to this document specifically address copyright pertaining to software. Section 101 defines a computer program as "...a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." (Helm, p. 25) Section 107 indicates that a person can make a copy or adaptation for archival purposes only. In addition, this archival copy must be destroyed if possession is not rightful anymore and adaptations can be transferred only with the authorization of the copyright owner. (Helm, p.26)

In addition, states do have written policies to address computer usage. As an example, Pennsylvania Crimes Code defines unlawful use of computer, and grades an offense as either a felony of the third degree or a misdemeanor of the first degree. Local universities have addressed these laws in documents disseminated to their faculties.

Have there been court cases to test current laws? Yes. In 1983, Apple Computer Inc. sued an Australian distributor of a Taiwan-manufactured version of Apple II, a personal computer. The PC named Wombat was sold with Apple II manuals. The Wombat "...either directly reproduced some of Apple's code, or at least achieved the equivalent result using 'reverse-engineering'."(Clarke, p.25)

According to the OTA, reverse engineering is a problem in interpreting copyright decisions.

> Reverse engineering refers to the unauthorized, although not necessarily illegal, reproduction of programs in their object or source code form .

> for the purpose of teaching, analyzing, or evaluating the concepts, techniques, or ideas embodied in the program. This process promotes innovation by allowing programmers to build on the works of others in the creation of new works. It also eliminates the need for redundant research and development. Reverse engineering allows abstract knowledge and techniques to be passed on, while prohibiting the wholesale appropriation and sale of another's work.
> (Goldstein, p. 84)

In this particular case, the Australian court failed to uphold Apple in 1983. After the government extended the Copyright Act to computer software, Apple won on an appeal in 1984. In 1986, the High Court of Australia reversed the previous decision, and handed the win back to Wombat. This flip-flop behavior of the courts is understandable. Lawyers cannot possibly understand every aspect of computer terminology. Lawyers are trained as lawyers and not as computer scientists. A new generation of lawyers literate in computer terminology, computer technology, and computer law is needed to deal with the present lack of consistent, precise definitions to be used universally in court proceedings. But all of this takes time to occur and, in the meantime, technology continues to explode at perhaps an exponential rate. What a dilemma this poses for the legal world.

Another type of case reaching the courts is one concerning whether software copyright protection extends to the "look and feel" of a program. The August 31, 1987 issue of Business Week reports on the pending copyright suits of Lotus Development Corp. They are suing competitors that sell software imitations of the Lotus 1-2-3 spreadsheet. The

issue at hand is not identical line by line code but rather intellectual property rights. Lotus contends that the displays encountered when using their software package is their property. Also, they argue that they own the system of commands the user enters to manipulate the spreadsheet.

In the April 4, 1988 issues of both Business Week and Time, there are articles relating that Apple Computers Inc. is suing Microsoft Co. and Hewlett-Packard Co. for imitating the "look and feel" of the graphics of the Macintosh personal computer. Just like Lotus, Apple contends that they own the intellectual property rights to the displays that appear on screen and to the commands the user types to manipulate the package. As indicated in the Time article, software manufacturers must now worry whether programs currently under production will be declared as illegal "look and feel" copies by the courts.

Still another interesting court case is that reported in the April 15, 1988 issue of Datamation. A small software firm named Inslaw, Inc. sued the U.S. Department of Justice for software piracy and won. Inslaw had developed PROMIS, a case-tracking software package. After the Department of Justice had obtained one copy of the source code, the department refused to pay certain fees, and terminated its contract with Inslaw. Then, the Department of Justice pirated 20 additional copies of the software. The next target of Inslaw may very well be AT&T Information Systems for collusion with the Department of Justice in forcing Inslaw into liquidation.

The struggle for intellectual property rights has also surfaced with mainframes. International Business Machines Corp. and Fujitsu Ltd. had a dispute concerning legal rights to the operating system of the mainframe in question. Rather than take the case to court, the two companies worked via arbitrators. Their settlement allows either company to pay a fee to view the other's software and to imitate it. As noted in Business Week's October 5, 1987, the operating system was the last IBM fully-controlled part of the mainframe.

Every case cited thus far has dealt with copyright protection and violations. Another avenue for software safeguards involves the use of patents rather than copyrights. Anne W. Branscomb, an attorney specializing in communications, computer, and copyright law, explains in detail in the May/June 1988 issue of Technonology Review some distinguishing characteristics of copyrights and patents with respect to intellectual property rights.

> ...copyright law covers original "works of authorship" as long as they are "fixed" in a "tangible medium" such as a book. Copyright protects the literary expression of an idea, rather than the idea itself, from unauthorized copying for the life of the creator plus 50 years (or, for corporations, for a total of 75 to 100 years). Other authors can make "fair use" of a copyrighted work - for example, quoting a passage in an article or review - without asking the original author's permission. More extensive use requires permission and often the payment of a royalty.
>
> Patent law protects inventions or discoveries that are registered with the U.S. Patent Office. Unlike copyright, a patent protects not only the expression but the actual useful features of a product or process for 17 years. A design

> receives protection for 14 years. Patent rights grant a monopoly, good against those who independently discover the same design or product. But rights can be licensed to other users.
>
> However, a patent is much harder to get than copyright. To be eligible for patent protection, a work must have distinguishing features that are innovative, useful, and not obvious. And the application process often takes two years or more.
>
> (Branscomb, p. 41)

In the March 1988 issue of High Technology Business, Steven J. Frank, a Boston lawyer, discusses the protection afforded to computer programs from patents. Frank states: "The appeal of a patent lies in its strength - patent owners can stop others from using, making, or selling their inventions for 17 years." (p. 17) The problems inherent in a patent approach as a solution to software legal problems lead to the following disturbing questions:

1. How can one determine if a piece of software is novel?
2. Will the use of patents stifle creativity in software development?
3. Are patents worth the additional cost?
4. Will the widespread use of patents render easier and clearer solutions in court cases?

Perhaps, the current "look and feel" court cases would not exist if patents had been obtained for windows and command key operations. Frank relates how duplication of spreadsheet programs would have been curtailed if the very first spreadsheet program had been patented.

Thus, court cases of copyright infringement have hit the business world. As yet, these legal issues have not surfaced in the education world. But, they may soon. What will happen

when they do? Educators must prepare themselves for the future. Are they in danger of lawsuits from the software industry or even from their own faculty? Does academia strictly adhere to the laws in existence? How are institutions of higher learning handling the problems inherent in faculty use of campus computing facilities to develop software with high market value? Who gets the profit - the school, the faculty member or both? Should there be an intermediate category other than a copyright or patent to handle the intellectual property rights due to the creators of software? Academia and the legal system need to address and to solve such problems very soon.

What are the societal and ethical issues concerning intellectual property rights in computer education? The societal and ethical issues are interrelated. According to the OTA, "Neither the threat of legal action, nor the education of users about copyright may be enough to change public attitudes and behavior. Only if the public perceives copyright rules as fair and reasonable will they voluntarily respect the law." (Goldstein, p.121) Education of users has been a prime concern of groups such as the Association of Data Processing Service Organizations (ADAPSO), one of the major trade associations representing the computer industry, and EDUCOM, a nonprofit consortium of some 500 colleges and universities.

ADAPSO states in its brochure entitled "Thou Shalt Not Dupe", that the same person who would not shoplift a software

product does not consider making copies of a software package a crime. (Goldstein, p.121) Clearly, such behavior is illegal yet it does occur in education. How easy it is to type a copy command to copy the entire contents of one disk to another! Does society condone such behavior? Is such behavior ethical and in keeping with the Honor Philosophies and Codes found in college catalogues? Clearly, it is not.

Consider the EDUCOM Code - A Policy on Intellectual Rights.

> A respect for intellectual labor and creativity is vital to academic discourse and enterprise. This principle applies to works of all authors and publishers in all media. It encompasses respect for the right to acknowledgement,right to privacy, and right to determine the form, manner, and terms of publication and distribution.
>
> Because electronic information is volatile and easily reproduced, respect for the work and personal expression of others is especially critical in computer environments. Violations of authorial integrity, including plagiarism, invasion of privacy, unauthorized access, and trade secret and copyright violations, are grounds for sanctions against members of the higher education community.
>
> (Green and Gilbert, p.48)

How does society itself regard intellectual property rights? The OTA published the major findings of a survey entitled "Public Perceptions of the Intellectual Property Rights Issue" in February 1985. In this document, the OTA reported the following conclusions. The public admits that they are not well-versed on this issue; they do not feel that the issue effects them. The vast majority finds some form of copying acceptable. They indicate a tolerance for "gray area" behavior. They are willing to copy and to share information. They do acknowledge that such behavior is wrong

but put the burden on industry to stop such crime. (Goldstein, p. 122)

What have business and industry done to stop the piracy of software? They have put copy protection devices on software packages. Hackers have found ways to outwit such devices; commercial programs are sold to break copy protection devices. Software manufacturers have developed techniques for copy protection on hard disks also. The end result has been that legitimate users have balked at these inconvenient copy protection techniques and have asked for their removal from software packages. Computer software producers have listened to their consumers and eliminated such techniques as being nuisances. Also, they have encouraged site licensing for businesses and schools. Shrink wrap licenses appear on all packaged software to explain to the user the laws applicable to the purchase of software. Thus, the computer software industry has done its part to educate and to explain to the user what constitutes proper behavior.

Should society be concerned about copying software illegally? Yes. In 1986, the Software Publishers Association placed a value of one billion dollars on the loss incurred in one year to individual copying and pirating. (Antonoff, p.148) Also, Lotus reports a loss of $160 million every year from potential sales, and Wordstar one of $177 million in 1984. (Branscomb, p.42) The latter software package qualifies as "...one of the most pirated programs in the history of personal computing." (Antonoff, p. 157)

Software manufacturers are forced to raise prices to contend with the huge loss in revenue. If copying were eliminated, society would benefit. In Technology Review, Branscomb states that "...effective protection of intellectual property is not just a legal matter. It is also a function of public attitudes and opinions. No law, no matter how carefully worded, can prohibit widespread practices that the public considers acceptable." (p. 44) Branscomb continues, "While ethical standards for using new information technologies are still in an early stage of development, it seems clear that the public favors flexibility - as long as the original owner of the copied product enjoys no commercial advantage." (p. 44)

In an article entitled "The Decline of Copy Protection", Michael Antonoff quotes Leon Williams, President and Chief Executive Officer of MicroPro International Corp., with respect to the changing market: "There's generally a different ethic in the software market today.... Everyone used to think it was cute to break copy protection and pirate a program. Now, they realize it's more important to have access to frequent updates. The market is maturing." (p.157) Antonoff states that the methods used to discourage copying include lawsuits against violators and public-awareness campaigns.

In corporations, the strategies named above have worked. Antonoff notes that: "While copy violation in big business is way down, transgressions in the small business and education environments continue to be a problem." (p.14) In

the corporate environment, copying has been minimized due to the increased number of court cases upholding the law and also due to the threat of suspension or discharge. Companies such as Singer Company in West Paterson, NJ hold orientation sessions for new employees to explain computer law, they display stickers on equipment to remind users of this law, and they suspend or discharge violators.

In the January/February 1987 issue of Change, Kenneth C. Green and Steven W. Gilbert state that colleges and universities want to eliminate illegal and unethical copying. They note that colleges and universities"...have a moral responsibility to promote legal and ethical behavior with respect to computer software." (p. 47) They realize that they must combat this serious problem so software vendors will offer them discounts and on-site agreements. In addition, they want to avoid lawsuits. As yet, no college or university has been sued for copying violations. However, this does not mean that they are immune to prosecution. It simply has not happened - yet.

Green and Gilbert note: "In higher education we have strong traditions of respect for intellectual property that are essential to the conduct of our most important activities and to the mission of our institutions. We do not tolerate the theft of property or ideas, nor do we condone plagiarism." (p. 48) They continue, "...most of us would not think of copying a book instead of buying it. However, many students and faculty seem to view electronic media differently from printed materials." (p. 48) Perhaps, part

of this difference stems from the fact that software can be copied exactly and quickly by simply pressing a single key. It is so easy to do; perhaps too easy.

Green and Gilbert explore some ways the collegiate environment can handle this problem. Academia must educate all those on campus as to what is appropriate, ethical, and legal behavior. Copying should be treated as plagiarism or theft. Site agreements should be encouraged. (p. 49)

In summary, the legal issues of intellectual property rights are being tried in halls of justice at the present time. Corporations are being held responsible for their actions. Computer Law courses must continue to be developed to prepare law students to cope with the drastic on-going changes in technology and with the necessary legalities to address these changes. Precise definitions of computer terminology are needed to help lawyers deal with such legal issues in the courtroom. Present lawyers must be retrained to handle such cases. Because of the impossibility of predicting future technology, the legal system must be constantly kept abreast of current changes, and laws must reflect such changes as soon as is humanly possible. This is a definite Herculean task for the legal system.

Society must either uphold the current laws or change the present laws in accordance with their beliefs. Society must also become aware of why the laws exist. People must understand that copying is theft since computer software designers are losing money due them. Pirating hurts the

economy in many ways as noted by Green and Gilbert.

> Illegal copying costs everyone. Some industry observers estimate that the number of illegal or unauthorized copies of various software programs approaches the total number of legal copies. Piracy deprives software authors and publishers of payments and royalties, part of which would be reinvested in product development and enhancement. It also contributes to higher software prices as developers and publishers factor in a "piracy cost" in pricing their new products. Equally important, illegal copying may deprive the academic community of the new software we want for instruction and research: If software developers find they cannot obtain a reasonable return on their investment for campus oriented products because of the piracy problem, they will simply refuse to develop software responsive to the needs of campus users.
>
> (Green and Gilbert, p. 49)

As an aside comment, the September 26, 1988 issue of Time contained a most curious and interesting way in which two Pakistani brothers handled the thorny issue of intellectual property rights by taking matters into their own hands. They sold Lotus 1-2-3 to foreigners, especially Americans, for only $1.50. But, recall the adage , "Caveat emptor"; that is, "Buyer beware." On each disk, they placed an elegant computer virus that eventually spread to at least 100,000 disks. They strongly felt that pirates should be punished, and that is exactly what they did do. They outwitted the pirates.

What can computer users and educators do in academia to address the issues of intellectual property rights on their own campuses? Emphasize ethical issues in the media on your campus. College and university faculty have a responsibility to educate their constituents and themselves, too. Computer science educators should include a section on computer ethics

in their courses. Educators and computer users in academia are role models for other computer users on campus. They must show that they do believe in the adage, "Practice what you preach", and show it by examplary behavior. They should ask themselves the following questions:

1. Have you copied a software package for yourself or others?
2. Have you noted students or colleagues robbing software packages in the computer room?
3. Did you feel that such behavior was a violation of the Honor Philosophy Code on campus?
4. Did you interfere or stop such illegal copying?
5. Did you report the theft to anyone on campus?
6. Does each computer contain a written notice reminding the user of copyright laws?
7. Does your campus have a written code concerning proper legal behavior and penalties for violation?
8. Has your campus tangled with the problem of ownership of intellectual property rights for faculty software developed with the use of campus facilities?

Perhaps, the solution to the blatant copying of software resides in each individual. If you yourself agree that computer crime is a serious offense, then you and others like yourself will make a difference. Academia cannot hide or ignore the problems that do exist on campus today. The legal, societal and ethical issues concerning intellectual property rights clamor for confrontation and resolution. Academia must lead the way in a positive, earnest way, and must enforce discretions with full strength. Nothing else will do.

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